DOCUMENT RESUME

ED 097 865 IR 001 223

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TITLE	Process for Developing Beneficial Resource Sharing Agreements Among Autonomous Institutions.
INSTITUTION	Toronto Univ. (Ontario).
PUB DATE	Oct 74
NOTE	16p.; Paper presented at the EDUCOM Fall Conference (Toronto, Ontario, October 1974)
AVAILABLE FROM	EDUCOM Fall Conference Proceedings, EDUCOM, Rosedale Road, P. O. Box 364, Princeton, New Jersey 08540 (Estimated price $6.00 to members, $12.00, nonmembers)
EDRS PRICE	MF-$0.75 HC-$1.50 PLUS POSTAGE
DESCRIPTORS	Administrative Organization; *Computer Oriented Programs; Computers; *Cooperative Planning; *Interinstitutional Cooperation; Resources; *Shared Services; Speeches; *Universities
IDENTIFIERS	Canada; METANET; Ontario

ABSTRACT

A task force was formed to facilitate resource sharing of computer services among Ontario universities. The long range objective was to make available to the universities computer services of the highest quality, effectiveness, and efficiency. Control and financing of the system had to be arranged first. Different system structures were considered before the process approach was selected in order to cope with the rapidly changing world of computer services. The facilitating structure recommended provided for: (1) computer services policy definition and identification of needs at both the institutional and system level; (2) a means of problem perception by analysis of appropriate information; (3) an incentive for institutions to get together to resolve perceived problems; (4) a mechanism for participatory development of detailed proposals and establishment of resource sharing agreements; (5) a means of review and assessment to ensure progress and effectiveness; (6) an environment which encourages initiative; (7) a lower threshold for participation; and (8) a mechanism for ensuring fair and equitable interinstitutional trade. (Author/WCM)

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ED 097865

PAPER PRESENTED TO

EDUCOM CONFERENCE

TORONTO

OCTOBER 1974

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IR 001 223

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PROCESS FOR DEVELOPING BENEFICIAL RESOURCE SHARING AGREEMENTS AMONG AUTONOMOUS INSTITUTIONS

At a recent colloquium on the Future of Scientific Communications sponsored by the National Science Foundation, several speakers, Russell Ackoff in particular, stressed the need to identify and agree upon long range global objectives before dealing with secondary objectives and implementation. He pointed out that it was possible that an overall objective might be attainable together with sub-objectives each of which was, on its own, totally unthinkable. He gave as an example, the following sub-objectives:

1. That the capital of France be moved from Paris.
2. That Paris become a free city with no passports required or import duties, etc.
3. That the French language no longer be the official language of Paris.

Apparently these seemingly impossible objectives are under serious consideration by the government of France. How this is possible only becomes clear when one learns that the long range global objective is to make Paris the informal capital of the world.

When the Task Force on Computer Services began its work, in late 1973, one of the first questions it decided to tackle was to specify long range global objectives. Its terms of reference interestingly enough did not include this task. In fact some of the members, including myself, thought that we could automatically assume that resource sharing was a "good" thing and that all we had to do was find an administrative structure to manage university computing resources which would be acceptable to all Ontario universities.

The Task Force itself was formed as a result of a proposal to develop a message switched network to join up a number of university computer centres.

The objective of the METANET proposal was to facilitate the sharing of computer services among Ontario universities. Objections were raised on a number of grounds; notably, that it was not clear that the inter-institutional traffic would justify such a network and that the existing private

communications facilities provided an adequate vehicle. A consultant pointed out the need to solve the administrative barriers to resource sharing and recommended the formation of the present Task Force. The Task Force was set up by the Board for Computer Coordination of the Council of Ontario Universities. The following people were members and observors:

Dr. H.S. Gellman	- President; Gellman, Hayward & Partners Ltd.
Dr. A.J. Grindlay	- Professor, School of Business Administration; The University of Western Ontario.
Mr. W.H. Jenkins	- Director, Computer Centre; Queen's University.
Mr. D.S. Macey	- Office of Computer Coordination; Council of Ontario Universities.
Dr. P.P.M. Meincke	(Chairman) - Vice-Provost; The University of Toronto.

OBSERVORS:

Dr. G.D. Anderson	- (Chairman of the Board for Computer Coordination of the Council of Ontario Universities) Professor, Department of Clinical Epidemiology and Biostatistics; McMaster University.
Mr. H.H. Walker -	- Representative; Committee on University Affairs.

We concluded that the long range global objective was to make available to the universities computer services which were of the highest quality, effectiveness and efficiency.

Certainly few could quarrel with that as a global objective, especially in the face of increasing financial stringencies. The problems come when one explores the sub-objectives that appear to be necessary.

A key question which has to be answered before much progress can be made toward meeting the objective is where should control over computer services lie? One could envisage a province wide educational computing agency funded directly by the Government and providing free services to all educational institutions. For one thing, this would contravene the standard

funding arrangement whereby funds flow to the institutions based entirely on the number of students. It is strictly up to the universities to decide how to spend that money. Moreover, the Government would then be faced with exactly the same problem the universities are faced with to-day. How can they be sure that the level of service is appropriate and that the service is not being misused? The Task Force endorsed the approach recommended by an earlier COU Task Force on Computer Charging; namely, to put the money to purchase computer services as close to the user as possible. This approach has a number of advantages:

1. The level of service is then determined automatically by the aggregate of the decisions of a large number of users and is made in competition with other demands on the dollar at a level where such decisions can best be made.

2. Decisions about what services should be offered can be made in terms of the viability of those services. Individual needs could be met by purchasing outside the institution.

3. The effectiveness and efficiency of the facility is much easier to measure in terms of profit or loss.

4. The cost benefit of the use of the computer in instruction is assessed where it can best be assessed--close to the instructional process.

5. The computer centre director becomes much more of an entrepreneur than before. He must be highly conscious of his market and very service oriented; but, he is freed from the shackles of special interest user groups and policy committees.

At this point, I would like to make a personal observation. Decisions to put money in the hands of the users of university facilities represents a major change in the mode of management of universities from the traditional mode to a free market mode.

The current pattern of management can be represented schematically as shown in Figure 1. Money flows through some central allocation process in which budget committees, administrators and governing bodies are all involved. It is allocated to the teaching departments and to the facilities such as the computer centre, the library and the media centre. The nature of the facility and the level of its budget are to some extent determined through the formal mechanism of advisory committees. Attempts are made to measure the quality, efficiency and effectiveness of the service; but, these are very difficult things to measure, and the effect on the educational process is even harder to evaluate. By and large, the facility manager is expected to manage the facility, provide the best service possible within the budget allocation and keep the complaints to a minimum.

Under this mode, the facility is available, the user generally does not have to worry about direct trade offs against other needs and the incentive for the user to control the use of the facility is low. If the facility does not provide adequate service, there are a number of routes for complaints. Usually the facility manager comes under fire first, but it is also possible for the more powerful users to put pressure on deans, central administrators and the advisory committees. If the problem is very serious often an ad hoc task force is formed to examine the situation and make recommendations. This is the traditional mode of management and has been called the "squeaky wheel" or "paternalistic" mode of management. In this mode, it is up to the facilities manager to provide the proper level of service and to fight for adequate funds in competition with the departments, but with the help of the advisory committee. This mode of management is quite successful if funds are not in short supply; but, the facility manager is placed in a very difficult position if the resources are simply not sufficient to meet demand and there are no constraints placed on the source of the demand.

The free market mode is illustrated in Figure 2. The budget allocations are made on the basis of demonstrated need. This requires that the central structures look very carefully at the quality of the research and teaching of the departments and the effectiveness and efficiency with which they use the budget allocation. The departments must decide how they are going to spend the budget allocation and must make hard trade off decisions between buying such things as computer services equipment or supplies. It is at this level that the real value of these services can best be judged, but it does require that the members of the department accept the authority and responsibility for making such trade off decisions.

Real dollars are budgeted for purchasing services from the facility thus establishing the budget of the facility and the level of service to be provided.

Obviously a few caveats are required. If the service is new or if the transaction cost is so small it is not worth the accounting cost, university policy may provide a more centralized flow of dollars. It would also be necessary to provide for funds to cushion rapid declines in demand and possibly venture capital for new services.

A major concern is the effect on the academic environment. The devolution of this real responsibility and authority to the users may create unwanted burdens on the staff. There are already some signs of this in the University of Toronto as we move to putting money in the hands of the users.

If universities really did go into this free market mode, and users were free to buy computer services wherever they felt they got the best deal and computer centre directors were able to make arrangements among themselves to distribute the computing load in the best possible way, then that might be all that is required to meet the objective. Certainly the Task Force felt that an essential sub-objective was to put free funds in the hands of the user no matter what else was done.

The shift from one mode to another is a very complex operation. Another possible problem might be unfair competition, the selling of computer services at well below cost from facilities with excess capacity, etc. It was considered essential to have an independent body that the universities could call on for advice as money was gradually put in the hands of the user over a period of time. It was also essential in the view of the Task Force to ensure that the prices charged for inter-institutional trade were fair and equitable. This may seem contrary to the philosophy of a free market but one has to recognize that the universities are not accustomed to an inter-institutional trade mode and there will inevitably be some difficulties in moving into that mode. Thus we recommended the establishment of a Prices Review Panel. (Figure 3.)

The Task Force was not convinced that putting money in the hands of the user and expecting the computer centre directors to make the necessary arrangements among themselves for the distribution of the load among the facilities would be sufficient to meet the overall long range objective. This is not to disparage the computer centre directors but to recognize the political realities of their situation. The facilities are still closely linked with universities and any load sharing arrangements suggested by the directors would still have to be ratified by the decision making process of the universities and be subjected to the same sort of scrutiny that most resource sharing proposals receive.

Another important factor is that the sharing of hardware resources is rapidly becoming a small part of the much larger picture of computer resource sharing. Software, Data Banks, Catalogue Support Systems, Student Information Systems are other such computer related resources. Moreover, the whole picture changes very rapidly from year to year and the Task Force felt quite strongly that to recommend a structure for the management of hardware and operating system software alone was to tackle only part of a much larger problem. We therefore decided to recommend a process rather than a structure.

The title of Ackoff's talk at the NSF colloquium was, "The Ideal Systems Design". He strongly urged that we stop trying to find the Utopian ideal to solve all problems and adopt the notion of process. We must recognize

that we cannot know everything now and that the system must be capable of learning about itself. A process approach, he claims, stimulates creativity because it removes many of the constraints.

I was delighted to hear one of the leaders in operational research point this out because the Task Force had quite independently come to the conclusion that it had to recommend a process rather than structure in order to cope with the rapidly changing world of computer services and remove some of the self imposed constraints that people develop.

We then determined what had to happen in this process. We examined the events leading up to successful resource sharing agreements and found that the following things have to happen:

1. Each institution must clearly articulate exactly what it expects from the service and identify the need for such services.

2. Identification of areas where a resource sharing agreement might be beneficial in meeting the aggregated needs of some institutions.

3. There must be some incentive for the institutions to explore such possibilities.

4. A detailed proposal must be developed so that each institution can assess the effect of the proposal on its capability of meeting the institution's needs.

5. There should be an independent review and assessment of the effectiveness of the process.

In addition to these particular activities, there are certain principles which should guide the way in which the process is carried out:

1. The institutions themselves must participate directly in the development of the detailed proposals which may affect them.

2. It is better to start a sharing project with just a few institutions and then others can join this nucleus.

3. Nothing in the process should limit participation to universities alone.

4. The management of a resource sharing agreement should rest with the participating institutions.

5. It is essential to provide some start-up funds.

6. Each institution must retain control over how much and what types of computer services it uses. (This does not mean that the services have to be provided by facilities located at that institution.)

7. The most effective implementation of any cooperative project will likely involve some loss of direct control of the facility and will likely mean that money will pass between institutions.

The next question is what is required to make these things happen.

Originally, the Task Force called the first activity, "Planning for Computer Services instead of Computers". Quite properly, the computer centre directors have taken exception to the implication that they have not been planning properly. The Task Force was really calling attention to the fact that many universities operating under current management modes were not clearly articulating what they wanted computing centres to do.

Many computer centre directors have commented that the universities are only now providing a framework of objectives within which they can operate. Certainly there have been implicit objectives but these have been clearly and publicly stated in very few cases.

It is essential that each university have a reasonably clear idea of what it expects in the way of computer services before it can make a sensible decision between alternative methods of providing those services. The Task Force felt that although the computer centre director may be one of the most qualified individuals to provide such information, he was not in a good position politically. Therefore we identified the need for an individual outside the direct administrative structure of the computer centre to provide an independent planning for services function. Obviously such an individual is needed if there is no on-campus facility.

Together with his counterparts from other universities, we saw the Computer Services Co-ordinator bringing together information which would help to identify areas where resource sharing might prove beneficial. It has been pointed out that the people actually involved should participate in this identification process; the computer centre directors in facilities management, the admissions officers for admissions projects, etc. The Task Force had no intention of eliminating initiatives from these areas but rather facilitating such initiatives. We thought this could best be done in a Services Planning Group composed of all the Computer Services Co-ordinators. Again, the word planning may be misleading here.

Why must there be an independent review and assessment of the effectiveness of the process and how can this best be done? One of the characteristics of the so-called, "Ideal Systems Design" is that it is self-evaluating; but, the Task Force, I believe, had in mind the credibility of the process to external agencies such as the Government and even private enterprise.

We therefore recommended a Computer Services Board to review, evaluate and comment on the detailed project proposals and the reasons given by the universities for not participating. We endeavoured to give this Board

credibility by recommending a membership from both within and outside the universities. We recommended that the chairman be from outside the university community and that the Board prepare public reports.

Personally, I am quite convinced that another factor of equal importance is that such an external review and assessment is essential to counterbalance the pressure from within the universities, which will inevitably come up quite naturally from users who are vitally concerned about the effect of any resource sharing agreement on their access to, and use of the facility. I am not implying that such pressure in itself is bad or that concerned users have no right to be concerned if the university is going to downgrade the service to them. The point I am trying to make is that decisions made with only one side of the picture presented to the decision making bodies of the universities are bound to be one-sided. This is true not only of proposals that may have been initiated outside the universities, but also of those initiated by computer centre directors, business or admissions officers within the universities. The original proposal for regional centres in 1969 arose from a committee essentially composed of computing centre directors. It is not reasonable to expect the universities to make rational decisions without all sides of the argument clearly presented. In my view, it is only a body such as the Computer Services Board that can ensure that all sides of the case are presented, and it is only in this way that we can insist that the decisions on resource sharing continue to rest with the autonomous institutions and yet maintain credibility.

The next question is how to provide an incentive for the institutions to explore the opportunities for sharing. Obviously, start-up funds and Government policies play a big role here. The Task Force recommended a phased approach to lower the threshold for participation.

Phase One is the identification of an opportunity for possible resource sharing. This initiative can come from anywhere in the system. The institutions should be made aware of such opportunities and those institutions who are interested enough to commit resources to a detailed study opt-in to Phase Two.

Phase Two is the formation of a Project Task Force with representatives from only those institutions which have opted-in to this phase. The Project Team develops a detailed proposal which contains estimates of cost/benefit, administrative arrangements and an implementation schedule. This detailed proposal is then submitted to the decision making apparatus of the universities and to the Computer Services Board. The universities then decide to opt-in or -out of Phase Three. The Board reviews the detailed proposal and the reasons for the decisions of the universities. It makes its own comments and recommendations on these matters.

Phase Three is then the actual implementation of the recommendations of the detailed proposal developed by the Project Task Force. Again I would like to stress that the management of the resource sharing projects or agreements should rest with the participating institutions. This is essential if there is to be resource sharing with institutions outside the COU and if the Board itself is to carry out independent review and assessments. Its judgments will not be credible if it is forced to associate itself or the Office of Computer Coordination closely with the management of the projects.

In order to give the Board a little more 'clout' we also recommended that it recommend to the COU on applications for special start-up funds or other grants and that all proposals for major new systems costing in excess of $100,000 go to the Board for information, evaluation and recommendation.

In summary, the facilitating structure we are recommending is shown in Figure 3. It is the opinion of the Task Force that the recommendations provide for:

- computer services policy definition and identification of needs at both the institutional and system level;

- a means of problem perception by analysis of appropriate information;

- an incentive for institutions to get together to resolve perceived problems where appropriate;

- a mechanism for participatory development of detailed proposals and establishment of resource sharing agreements;

- a means of review and assessment to ensure progress and effectiveness;

- an environment which encourages initiative;

- a lower threshold for participation;

- a mechanism for ensuring fair and equitable interinstitutional trade.

I would like to close with a personal observation. Over the past two years, I have had responsibility for the Library, Computer Centre and the Media Centre of the University of Toronto and have found that the patterns of the problems facing each of these services are very similar. Questions of centralization versus decentralization, charging, cost allocation and particularly resource sharing, are common to all three. Certainly, the three services vary considerably in the technical problems and the users they serve, but many of the overall policy matters and problems are extraordinarily alike.

It is very tempting to explore the notion of extending the pattern of the recommendations of the Task Force on Computer Services to cover these other information resources. If, indeed, the detailed management of co-operative projects should not rest with the coordinating structure but rather with the participating institutions themselves, then it may well be that the broad policy matters of information resources sharing and the initiation of cooperative projects could be dealt with by a single Review Board, Prices Review Panel and Planning Group. Time does not permit a detailed exploration of the disadvantages and advantages of such a scheme

but I thought it might be an interesting note on which to end this talk which really describes a general process for the development of resource sharing agreements among autonomous institutions.

P.P.M. Meincke

October 17, 1974

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FIGURE 1

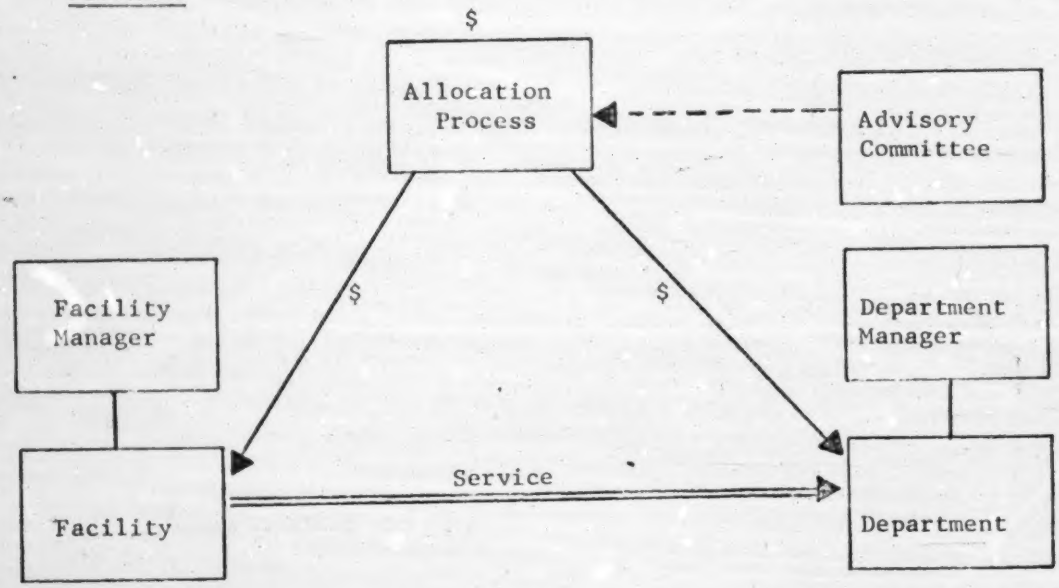

FIGURE 2

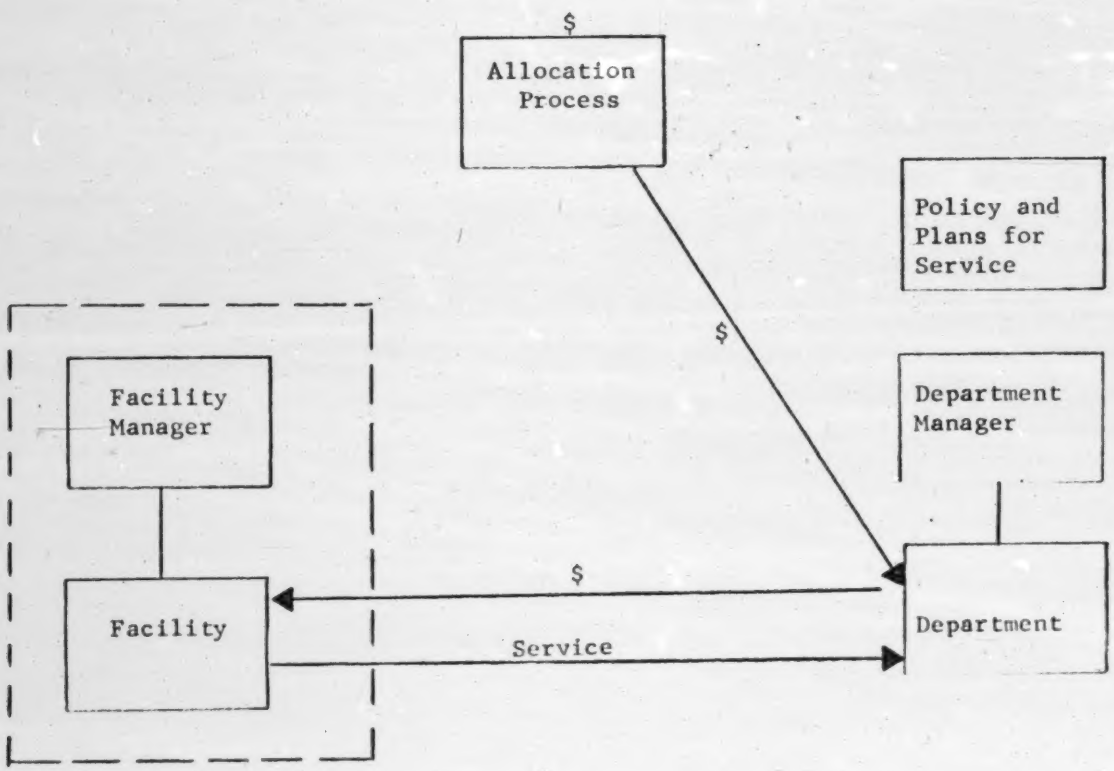

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FIGURE 3